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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,801	04/21/2006	Masato Nomiya	M1071.1967	5833

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EXAMINER

NGUYEN, KHANH TUAN

ART UNIT	PAPER NUMBER
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1796

MAIL DATE	DELIVERY MODE
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09/04/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/576,801	Applicant(s) NOMIYA ET AL.	
	Examiner KHANH T. NGUYEN	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on 08/04/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9-12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-12, and 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/09/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/04/2008 has been entered.

Response to Amendment

2. The amendment filed on 07/23/2008 is entered and acknowledged by the Examiner. Claims 1-7, 9-12, and 14-20 are currently pending in the instant application. Claims 8, 13, and 21-22 have been canceled.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 05/09/2008 has been considered. An initialed copy accompanies this Office Action.

Claim Objections

4. Claims 19 and 20 are objected to because of the following informalities: Claims 19 and 20 are improperly dependent on a cancel claim 13. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

5. To advance prosecution, the subject matter of claim 19 will be rejected on the same grounds as claims 5, 15, and 17 since the instant claims contain similar limitations. The subject matter of claim 20 will be rejected on the same grounds as claims 6, 16, and 18 since the instant claims contain similar limitations.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 3-7, 9, 15-16, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka et al. (U.S. Pat. 4,894,184 hereinafter, "Fukuoka") in view of Siuta (U.S. Pat. 4,594,181 hereinafter, "Siuta").

With respect to instant claims 1, 5-7, 9, 15-16, and 19-20, Fukuoka teaches a low-temperature conductive paste comprises of 50 to 95 wt.% of a conductive powder selected from a copper powder, copper alloy powder or copper oxide powder and 5 to 50 wt. % of a glass powder (i.e. glass frit) having a softening point of 300°C to 600°C

Art Unit: 1796

dispersed in an organic vehicle (Col. 2, lines 23-33). The lower limit of Fukuoka's softening point (300°) is readable on the claimed softening point. Fukuoka discloses the said copper oxide powder contains an oxide film on the surface of the metal powder (Col. 2, lines 48-49). The said conductive paste is used for connecting circuits on insulating boards such as ceramic boards (Col. 1, lines 12-25 and Col. 2, lines 15-23).

The difference between the instant invention and Fukuoka disclosure is that Fukuoka does not suggest a metal powder (e.g. copper) having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of the metal powder.

However, Siuta teaches a metal oxide-coated copper powder that is useful in conductor paste in laminated multilayer structures. The said metal oxide may be selected from the oxides of **Si**, **Ti**, Ce, **Zr**, **Al**, Ba, Li, Sr, La, **Mg**, Ca, V, Ta and the mixtures thereof (Col. 4, lines 11-13). The disclosure of Al oxide and Zr oxide are readable on the claimed alumina and zirconia inorganic components. In one embodiment, Siuta discloses copper alloy particle such as Cu/Cd, Cu/Cr, Cu/Ti and Cu/Cr is also useful as conductor (Col. 6, lines 14, 20). The said powder having an average particle size of 1-5 microns (Col. 5, lines 24). Siuta teaches the metal oxide-coated provide the copper powder with improve shrinkage characteristics and increase sintering temperature (Col. 2, lines 42-54).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the low-temperature conductive paste of Fukuoka by coating the copper powder of Fukuoka with the metal oxide layer as

Art Unit: 1796

suggested by Siuta in order to improve shrinkage characteristics and increase sintering temperature of copper powder in the conductive paste composition.

Regarding claim 3, at column 3 lines 34-35 Fukuoka discloses a glass frit having a softening point within the claimed range. Therefore, one of ordinary skill in the art would have had a reasonable expectation that the glass frit of Fukuoka will have a similar viscosity as claimed because the flowability and viscosity of the glass frit is directly related to its softening point. Thus, glass frit of Fukuoka is considered to read on the instant claim. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594.

Regarding claim 4, Fukuoka teaches a metal oxide-coated copper powder wherein the copper powder may be coated with a metal oxide (Col. 4, lines 11-13 and Claim 2) or copper-containing powder where metal such as Ag, Sn, and the mixture of said metal coat the copper powder (Col. 6, lines 18-19 and Claim 3). Fukuoka teaches also teaches the content of coated layer (e.g. Ag) ranges from 0.05 to 50 wt. % of the alloy powder (Cu-Ag) (Col. 4, lines 2-6). In other words, the content of coating on the surface of a copper particle is 0.05 to 50 wt. % of the alloy powder. Therefore, the metal oxide-coated copper powder of Fukuoka is considered to have a metal oxide layer (inorganic component) in the range of 0.05 to 50 wt. % because Fukuoka teaches a copper powder coated with a layer of metal oxide or metal within said range.

Art Unit: 1796

8. Claims 1, 3, 5-7, 9, 15-16, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshihara et al. (JP Pub. 62-022868 hereinafter, "Yoshihara") in view of Siuta (U.S. Pat. 4,594,181).

With respect to claims 1, 5-7, 9, 15-16, and 19-20, Yoshihara teaches an electrically conductive paste composition comprising of 90 to 97.5 Wt. % of Cu powder having a particle size of 0.3-1.5 microns; 1.5 to 2.0 wt. % of glass frit having a softening point of 250°C to 400°C; 1 to 6 wt. % of V₂O₅ having a particle size of 2 microns or below. The 100 wt. % of the said paste is mixed with 12 to 16 wt. % of organic vehicle (Abstract).

The difference between the instant invention and Yoshihara disclosure is that Yoshihara does not suggest a metal powder (e.g. copper) having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of the metal powder.

However, Siuta teaches a metal oxide-coated copper powder that is useful in conductor paste in laminated multilayer structures. The said metal oxide may be selected from the oxides of **Si**, **Ti**, Ce, **Zr**, **Al**, Ba, Li, Sr, La, **Mg**, Ca, V, Ta and the mixtures thereof (Col. 4, lines 11-13). The disclosure of Al oxide and Zr oxide are readable on the claimed alumina and zirconia inorganic components. Siuta teaches the said powder having an average particle size of 1-5 microns (Col. 5, lines 24). Siuta also teaches the metal oxide-coated provide the copper powder with improve shrinkage characteristics and increase sintering temperature (Col. 2, lines 42-54).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrically conductive paste of Yoshihara by

Art Unit: 1796

substituting the copper powder of Yoshihara with the metal oxide coated copper powder of Siuta in order to improve shrinkage characteristics and increase sintering temperature of copper powder in the conductive paste composition because such substitution is suggested by the prior art.

Regarding claim 3, Yoshihara discloses a glass frit having a softening point overlapping the claimed range. Therefore, one of ordinary skill in the art would have had a reasonable expectation that the glass frit of Yoshihara will have a similar viscosity as claimed because the flowability and viscosity of the glass frit is directly related to its softening point. Thus, glass frit of Yoshihara is considered to read on the instant claim. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594.

9. Claims 2, 10-12, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka (U.S. Pat. 4,894,184) in view of Siuta (U.S. Pat. 4,594,181) as applied to the above claims, and further in view of Hayakawa et al. (U.S. Pub. 2004/0144962 A1 hereinafter, "Hayakawa").

Fukuoka and Siuta are relied upon as set forth above. With respect to instant claims 2, 11-12, 14, and 17-20, Naito does not disclose a glass frit having a softening point of 650°C to 850°C.

In analogous art of electrically conductive paste composition, Hayakawa teaches electrically conductive paste comprising of 5 to 20 wt. % of glass frit [0015] having a softening point of 530°C to 650°C [0010] and metal particles selected from copper,

Art Unit: 1796

nickel, copper-nickel alloy having an average particle size of 0.5 to 30 microns [0019].

The content of metal particles and glass frit ranges from 55 to 85 wt. % [0015]. The upper limit of softening point of Hayakawa glass frit overlaps with the claimed glass frit softening point (650°C to 850°C). The said paste also contains 10 to 35 wt. % of an organic medium (i.e. organic vehicle) [0020].

Hayakawa teaches electrically conductive paste comprising of similar ingredients within similar proportions as the electrically conductive paste of Fukuoka in view of Siuta. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the composition of Fukuoka in view of Siuta to include a glass frit having a softening point of 650°C as suggested by Hayakawa.

Regarding claim 10, Hayakawa discloses a glass frit having a softening point overlapping the claimed range. Therefore, one of ordinary skill in the art would have had a reasonable expectation that the glass frit of Hayakawa will have a similar viscosity as claimed because the flowability and viscosity of the glass frit is directly related to its softening point. Thus, glass frit of Hayakawa is considered to read on the instant claim. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594.

Response to Arguments

10. Applicant's arguments with respect to claims 1-7, 9-12, and 14-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571)272-8082. The examiner can normally be reached on Monday-Friday 8:00-5:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KTN/

Application/Control Number: 10/576,801

Page 10

Art Unit: 1796

08/20/2008

/DOUGLAS MC GINTY/

Primary Examiner, Art Unit 1796